

WE CLAIM:

- 1           1. A method of operating basic industrial plant complex, comprising:  
2           arranging basic industrial plants including an oil refining plant, an oil-fired power plant, a  
3 cement plant, and a steelmaking plant in close proximity to or adjacent to each other; and  
4           combining said basic industrial plants by a plurality of transporters for partially or  
5           completely supplying product, byproduct or waste material from one of the basic industrial  
6 plants as a fuel, power source, and/or raw material for products to another plant in the basic  
7 industrial plants,  
8           transporting to said cement plant at least two of spent catalyst waste from the oil refining  
9 plant, drain sludge from a storage tank of the oil-refining plant, slag from the steelmaking plant  
10 and dust from the steelmaking plant.
2. The method of operating basic industrial plant complex, as claimed in claim 1,  
wherein said basic industrial plants are located alongside sea and have a common port facility.
3. The method of operating basic industrial plant complex, as claimed in claim 1, further  
comprising the step of delivering supplying products from said basic industrial plants to outside  
of said complex.
4. The method of operating basic industrial plant complex, as claimed in claim 1, further  
comprising the step of treating waste materials, generated inside and/or outside of said complex,  
within said complex.

5. The method of operating basic industrial plant complex, as claimed in claim 1, further comprising the step of treating, in one lot, exhaust gas as gaseous waste from the oil refining plant, the oil-fired power plant, the cement plant, and the steelmaking plant.

6. The method of operating basic industrial plant complex, as claimed in claim 5, further comprising the steps of:

desulfurizing said exhaust gas as gaseous waste generated from the oil refining plant, the oil-fired power plant, the cement plant, and the steelmaking plant in the common waste gas treatment facility in one lot to remove harmful materials; and

supplying gypsum as byproduct generated from the waste gas treatment facility to the cement plant through one of said transporters.

7. The method of operating basic industrial plant complex, as claimed in claim 1, further comprising the steps of:

treating in a common waste liquid treatment facility in one lot, waste liquid generated from the oil refining plant, the oil-fired power plant, the cement plant, and the steelmaking plant to remove harmful materials, and

supplying sludge containing said harmful materials to the cement plant.

8. The method of operating basic industrial plant complex, as claimed in claim 5, further comprising the steps of:

treating in a common waste liquid treatment facility in one lot, waste liquid generated from the oil refining plant, the oil-fired power plant, the cement plant, and the steelmaking plant

5 to remove harmful materials, and

6 supplying sludge containing said harmful materials to the cement plant.

1 9. The method of operating basic industrial plant complex, as claimed in claim 1, further  
2 comprising the steps of:

3 using crude oil as a raw material at said oil refining plant to produce gasoline, kerosene,  
4 gas oil, and residues, which are obtained from one hydrodesulfurizing unit other than residues in  
5 one lot through atmospheric distillation unit;

6 supplying, with one of said transporters, at least one of sludge from storage tanks for the  
7 products, spent catalyst waste and waste gas from the hydrodesulfurizing unit to the cement  
8 plant; and

9 supplying, with one of said transporters, the heavy oil or residues as fuel to at least one of  
10 the oil-fired power plant, the cement plant, and the steelmaking plant.

1 10. The method of operating basic industrial plant complex, as claimed in claim 1,  
2 further comprising the steps of:

3 using, at said oil-fired power plant, heavy oil or residues as fuel from the oil refining  
4 plant to produce power as product; and

5 supplying, with one of said transporters, power to the oil refining plant, the cement plant,  
6 and the steelmaking plant.

11. The method of operating basic industrial plant complex, as claimed in claim 1,  
further comprising the step of:

supplying steam or hot water as heat source from said oil-fired power plant to the oil refining plant with one of said transporters.

1 12. The method of operating basic industrial plant complex, as claimed in claim 1,  
2 further comprising the steps of:

3 producing steel products from scrap as a main raw material in an electric arc furnace at  
4 said steelmaking plant; and

5 supplying slag and dust generated from the steelmaking plant to the cement plant with  
6 one of said transporters.

1 13. The method of operating basic industrial plant complex, as claimed in claim 7,  
2 wherein said cement plant uses limestone as a main raw material to mainly produce  
3 Portland cement, and uses heavy oil or residues, and waste gas from the oil refining plant as fuel  
4 in a burning process thereof, and further uses, as an auxiliary raw material or a part of fuel, at  
5 least one of the spent catalyst waste from the oil refining plant, the drain sludge from the storage  
6 tanks, the slag and dust from the steelmaking plant, the gypsum from the waste gas treatment  
7 facility as byproduct, and the sludge from the waste liquid treatment facility.

1 14. The method of operating basic industrial plant complex, as claimed in claim 8,  
2 wherein said cement plant uses limestone as a main raw material to mainly produce  
3 Portland cement, and uses heavy oil or residues, and waste gas from the oil refining plant as fuel  
4 in a burning process thereof, and further uses, as an auxiliary raw material or a part of fuel, at  
5 least one of the spent catalyst waste from the oil refining plant, the drain sludge from the storage

6 tanks, the slag and dust from the steelmaking plant, the gypsum from the waste gas treatment  
7 facility as byproduct, and the sludge from the waste liquid treatment facility.

1 15. A method of operating basic industrial plant complex, comprising the steps of:  
2 arranging basic industrial plants including a coal-fired power plant, a cement plant, and a  
3 steelmaking plant in close proximity to or adjacent to each other;

4 combining said basic industrial plants by a plurality of transporters for partially or  
5 completely supplying product, byproduct or waste material from a plant in said basic industrial  
6 plant complex as a fuel, power source, and/or raw material for products to another plant in said  
7 basic industrial plant complex,

8 transporting to said cement plant at least two of coal ash from the coal-fired power plant,  
9 slag from the steelmaking plant and dust from the steelmaking plant.

16. The method of operating basic industrial plant complex, as claimed in claim 15,  
wherein said basic industrial plants are located alongside sea and have a common port facility.

17. The method of operating basic industrial plant complex, as claimed in claim 15,  
further comprising the step of supplying products from said basic industrial plants to outside of  
said complex.

18. The method of operating basic industrial plant complex, as claimed in claim 15,  
further comprising the step of treating waste materials generated inside and/or outside of said  
complex.

19. The method of operating basic industrial plant complex, as claimed in claim 15, further comprising the step of treating, in one lot, exhaust gas as gaseous waste from the coal-fired power plant, the cement plant, and the steelmaking plant.

1 20. The method of operating basic industrial plant complex, as claimed in claim 19,  
2 further comprising the steps of:

3 desulfurizing said exhaust gas as gaseous waste generated from the coal-fired power  
4 plant, the cement plant, and the steelmaking plant in said common waste gas treatment facility in  
5 one lot to remove harmful materials; and

6 supplying gypsum as byproduct from the waste gas treatment facility to the cement plant  
7 through one of said transporters.

1 21. The method of operating basic industrial plant complex, as claimed in claim 15,  
2 further comprising the steps of:

3 treating, in one lot, waste liquid generated from the coal-fired power plant, the cement  
4 plant, and the steelmaking plant to remove harmful materials, and

5 supplying sludge containing said harmful materials to the cement plant.

1 22. The method of operating basic industrial plant complex, as claimed in claim 19,  
2 further comprising the steps of:

3 treating, in one lot, waste liquid generated from the coal-fired power plant, the cement  
4 plant, and the steelmaking plant to remove harmful materials, and

5 supplying sludge containing said harmful materials to the cement plant.

1 23. The method of operating basic industrial plant complex, as claimed in claim 15,  
2 further comprising the steps of:

3 using, at coal-fired power plant, coal as fuel to produce power;  
4 supplying power to the steelmaking plant and the cement plant through one of said  
5 transporters; and  
6 supplying coal ash generated from the coal-fired power plant to the cement plant through  
7 one of said transporters.

1 24. The method of operating basic industrial plant complex, as claimed in claim 15,  
2 producing produces steel products from scrap as a main raw material in an electric arc  
3 furnace at said steelmaking plant; and

4 supplying slag and dust generated from the steelmaking plant to the cement plant through  
5 one of said transporters.

1 25. The method of operating basic industrial plant complex, as claimed in claim 21,  
2 wherein said cement plant uses limestone as a main raw material to mainly produce Portland  
3 cement, and also uses as an auxiliary raw material or a part of fuel, at least one of the coal ash  
4 from the coal-fired power plant, the slag and dust from the steelmaking plant, the gypsum from  
5 the waste gas treatment facility as byproduct, and the sludge from the waste liquid treatment  
6 facility.

1 26. The method of operating basic industrial plant complex, as claimed in claim 22,

2 wherein said cement plant uses limestone as a main raw material to mainly produce Portland  
3 cement, and also uses as an auxiliary raw material or a part of fuel, at least one of the coal ash  
4 from the coal-fired power plant, the slag and dust from the steelmaking plant, the gypsum from  
5 the waste gas treatment facility as byproduct, and the sludge from the waste liquid treatment  
6 facility.

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